

Application No. 10/591,476
Amendment dated Feb. 16, 2010
Reply to Office Action of October 16, 2009

Atty. Docket No. 033082 M 343

AMENDMENTS TO THE CLAIMS:

This listing of claim will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Canceled)
2. (Original) A film deposition method comprising the steps of:
supplying a source material including a Cu-carboxylic acid complex or a derivative thereof onto a substrate; and
supplying a reductive gas to the substrate after stopping supplying the source material, wherein the step of supplying the source material and the step of supplying the reductive gas are performed alternately.
3. (Original) A film deposition method comprising the steps of:
placing a substrate in a process container; and
repeating the following steps (a) to (d):
(a) supplying a source material including a Cu-carboxylic acid complex or a derivative thereof onto the substrate;
(b) removing residual gases in the process container therefrom after stopping supplying the source material;
(c) supplying a reductive gas to the substrate; and
(d) removing residual gases in the process container therefrom after stopping supplying the reductive gas.
4. (Original) The film deposition method according to claim 3, wherein the steps (b) and (d) are performed by replacing atmosphere in the process container with an inert gas, or by evacuating the processing container.

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5. (Previously Presented) The film deposition method according to claim 2, wherein the reductive gas is converted into radicals by using plasma when the reactive gas is supplied to the substrate.

6. (Previously Presented) The film deposition method according to claim 2, wherein the reductive gas is H₂ gas.

7. (Previously Presented) The film deposition method according to claim 2, wherein the source material contains copper trifluoroacetate.

8. (Currently Amended) A film deposition method that alternately ~~performing~~ performs a step of supplying a Cu-containing source material onto a substrate and a step of supplying a reductive gas to the substrate after stopping supplying the Cu-containing source material, wherein said method has:

a first film deposition period in an early deposition stage in which the two steps are performed alternately and each of the steps of supplying the reductive gas is performed for a first period of time T1; and

a second film deposition period following the first film deposition period in which the two steps are performed alternately and each of the steps of supplying the reductive gas is performed for a second period of time T2 shorter than the period of time T1.

9. (Currently Amended) A film deposition method comprising the steps of:
placing a substrate in a process container; and repeating the following steps (a) to (d):
(a) supplying a Cu-containing source material onto the substrate;
(b) removing residual gases in the process container therefrom after stopping supplying the Cu-containing source material;
(c) supplying a reductive gas to the substrate; and
(d) removing residual gases in the process container therefrom after stopping supplying the reductive gas,
wherein said method has:

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a first film deposition period in an early deposition stage in which the steps (a) to (d) are performed alternately and each of the steps of supplying the reductive gas is performed for a first period of time T1; and

a second film deposition period following the first film deposition period in which the steps (a) to (d) are performed alternately and each of the steps of supplying the reductive gas is performed for a second period of time T2 shorter than the period of time T1.

10. (Original) The film deposition method according to claim 9, wherein the steps (b) and (d) are performed by replacing atmosphere in the process container with an inert gas, or by evacuating the processing container.

11. (Previously Presented) The film deposition method according to claim 8, wherein the first film deposition period continues until Cu deposited on the substrate becomes a continuous film, and the second film deposition period continues until a Cu film with a desired thickness is formed on the substrate.

12. (Previously Presented) The film deposition method according to claim 8, wherein the first period of time T1 is in a range of 3 to 20 seconds and the second period of time T2 is in a range of 1 to 5 seconds.

13. (Previously Presented) The film deposition method according to claim 8, wherein the reductive gas is converted into radicals by using plasma when the reactive gas is supplied to the substrate.

14. (Previously Presented) The film deposition method according to claim 8, wherein the reductive gas is H₂ gas.

15. (Withdrawn) A storage medium in which software executable by a control computer of a film deposition system is stored, wherein upon executing the software the control computer controls the film deposition system to perform a Cu film deposition method,

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wherein the film deposition method includes the steps of:
supplying a source material including a Cu-carboxylic acid complex or a derivative thereof onto a substrate; and
supplying a reductive gas to the substrate after stopping supplying the source material, wherein the step of supplying the source material and the step of supplying the reductive gas are performed alternately.

16. (Withdrawn) A storage medium in which software executable by a control computer of a film deposition system is stored, wherein upon executing the software the control computer controls the film deposition system to perform a Cu film deposition method,
wherein the film deposition method alternately performs a step of supplying a Cu-containing source material onto a substrate and a step of supplying a reductive gas to the substrate after stopping supplying the Cu-containing source material,
wherein said method has:
a first film deposition period in an early deposition stage in which the two steps are performed alternately and each of the steps of supplying the reductive gas is performed for a first period of time T1; and
a second film deposition period following the first film deposition period in which the two steps are performed alternately and each of the steps of supplying the reductive gas is performed for a second period of time T2 shorter than the period of time T1.

17. (Previously Presented) The film deposition method according to claim 3, wherein the reductive gas is converted into radicals by using plasma when the reactive gas is supplied to the substrate.

18. (Previously Presented) The film deposition method according to claim 3, wherein the reductive gas is H₂ gas.

19. (Canceled)

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20. (Previously Presented) The film deposition method according to claim 3, wherein the source material contains copper trifluoroacetate.
21. (Previously Presented) The film deposition method according to claim 9, wherein the first film deposition period continues until Cu deposited on the substrate becomes a continuous film, and the second film deposition period continues until a Cu film with a desired thickness is formed on the substrate.
22. (Previously Presented) The film deposition method according to claim 9, wherein the first period of time T1 is in a range of 3 to 20 seconds and the second period of time T2 is in a range of 1 to 5 seconds.
23. (Previously Presented) The film deposition method according to claim 9, wherein the reductive gas is converted into radicals by using plasma when the reactive gas is supplied to the substrate.
24. (Previously Presented) The film deposition method according to claim 9, wherein the reductive gas is H₂ gas.